

Mouse Emulation with Multiple Switch Access and Using Electronic Switch Control (especially with Head Access in manual wheelchairs), CTG 2007

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Using zero pressure switches (electronic) can assist dramatically a student's ability to control multiple switch sites. However, the switches themselves are not the only reason abilities can increase. Switch placement, seating postural control and seating support for task involvement, monitor placement, onscreen keyboard choices, are all important.

However, really using mouse emulation, particularly with 3 switches is not being utilized as well as it might be. We are presuming that understanding its physical configurations, how to set it up with existing powered mobility, or how to set it up without a powered chair may not be known. We will share actual equipment set-ups, the physical configurations required and share learning strategies which appear to work.

We will then analyze a student's seating postures, and how to assist the student in access to their use of switches, for mouse emulation and control.

Equipment Set-Up and Physical Configurations Required

For a Manual Wheelchair or Non-wheelchair User

1. Mouse Emulator (Mouse Mover) Interface Box

- a.. Three switch Mouse Mover (from Adaptive Switch Labs)
- b. Five Switch Mouse Mover (from Adaptive Switch Labs or TASH)

2. USB Cable from Mouse Emulator to Computer (comes with Mouse emulator)

3. Switches to use the Mouse Emulator which can be plugged into the Mouse Emulator

- a. 5 switch configuration; . In 5 switch configuration, each switch performs one action. Plug switch into corresponding port of mouse emulator
- b. 3 switch configuration

To do 3 switches, each switch will perform more than one function. To move the cursor left & right, plug in the switch into the left OR right direction port. To move the cursor up and down, plug the switch into either the Up or Down direction port.

To click, double click, and click and hold, plug the switch into the Left Click port. (This switch will do 3 functions. First hit will be click, second hit will be double click, and holding down the switch will be "click and hold").

If using electronic switches, then a battery pack is needed to provide power to the switches.

These different functions work by performing a switch hit, then release, then switch hit again (this reverses the directionality of the cursor).

4. Concerns: Attention needs to be paid to switch location, and switch mounting so that it does not interfere with the computer activity to be managed. Using electronic switches at the head provides the child with efficient access to numerous switches.

Frequently we started by plugging in the up/down cursor switch at a back pad, and the left/right switch on the right, and then the left click/double click/click and hold on the left. However, with many students, (they teach us), it appears to be easier if the cursor controls are on the side pads, and the click/double click/click and hold are on the back pad. If you think about it, it allows you to use the back of your head, then use the sides to move the mouse, once in click and drag mode. However, these things need to be practiced. First by the teacher/therapist, then given to the student. Practice with known software, and with forgiving software.

Begin with just moving the cursor or “mr. Pointer” or call it the “arrow” or whatever, and move it to “point” to what you want. Don’t try and have accurate control to begin with.

- 5. Change in speed of responsiveness of the mouse** itself can be controlled two ways.
- From the control panel on the computer being used.
 - From the dip switches on the Mouse Emulator. (read carefully on the bottom, change then try, change then try).

For Powered Wheelchair User

This last year all the Powered chair manufacturers have developed new programmable electronics. If you are dealing with a brand new powered chair, it will have new electronics. If you have an older chair, you need to know the brand, and its type of electronics.

From the past:

- Invacare has MKIV, MKV (“mark four or mark five”) electronics
- Permobil, Quickie (Sunrise Medical), or Quantum (Pride) Rehab all had P &G (Penny & Giles) electronics
 - With P &G electronics determine “type” of joystick, as all joysticks are not able to be used as “mouse emulators”; often the joystick on the chair is NOT the type which includes the programmability to use for computer access.

Currently, the newer electronics on chairs are:

- Invacare has **MK6** electronics
- Permobil has newest Penny & Giles (**P&G**) electronics or older P&G still
- Quickie has Delphi electronics or **Q-tronix electronics**
- Quantum Rehab/Pride has Curtiss Electronics or **Q-logic** electronics

********This worksheet only deals with the older electronics; new ones are just coming out, and not yet in time for this hand-out. Will try and update as we have information. But the process is spelled out here.***

- 1. Determine Brand of Powered chair (and its subsequent electronics)**
- 2. You will need a programmer for the powered chair's programmable electronics to recognize and utilize the Mouse Emulator**
- 3. You will need an interface box added to the powered chair with a 9 pin connector**
 - a. For Invacare: COM (communication) or ECU (environmental Control) or AUX (auxiliary box). ALL of these are the same, just different names. (These will be labeled ECU 1 and ECU 2 or ECU 3 and ECU 4)
 - b. For P&G: ACM or auxiliary control module
- 4. Mouse Emulator/Mover and its USB cable (to plug into computer)**
- 5. Another cable which plugs into the Chair's interface box, and into the Mouse Mover (9 pin connector)**
- 6. For Wireless Use:**
 - Need additional transmitter and receiver.
 - Transmitter will be mounted on the chair ("line of sight" required)
 - Receiver will be mounted at the computer
 - Cable from AUX/COM/ECU/ACM interface will plug into transmitter

INVACARE Powered Chairs

For Invacare;s MKIV and MK5 (older electronics)

1. Plug the remote programmer into the control module of the chair
2. Turn On the Programmer.
3. You will choose "Performance Adjustments"
4. You will then move down the Menu to ECU 1, ECU 2, ECU 3 or ECU 4
5. You will select the ECU port's number (1,2,3, or 4) that you have the cable plugged into on the COM/AUX/ECU interface box.)
6. You will then select from the menu:
 - Communication (choices are Off, Motor, Communication)
7. You will then SAVE, and you will have a choice to SAVE in a specific Drive, (Drive 1,2,3, or 4; these are user areas, choose one different from the driving User area, when beginning.)
8. Go back to the Main Menu ("Performance Adjustments")
9. Select "NO driving" from the menu and turn it ON. Save it to the same Drive number as you have for use for the COM/AUX/ECU box.
10. In summary, you will choose a specific drive ("user" area, for mouse emulation, and "no driving" this will allow the child/adult to manage just mouse emulation when there).
11. You will need the child/user to now have a reset/mode change switch.
12. You will need to set up the chair for the DRIVES (user areas) to be managed by the adult or by the child. At first, set it up for management by the adult. Then, you can with the child's choice decide whether they want to manage changing Drives, or combining functions.

For the head array user there are several choices as to how to set up access to the Mouse Emulator and control of the chair.

*******All of them will require a reset/mode change switch.**

- 1. Adult controlled (not managed by user yet, initial set up)**

Add the reset/mode change switch, a mechanical one, by plugging it into the ASL interface box, under SEL (for “select”)

Velcro switch to rear of chair.

Use remote programmer and follow directions as stated above in section programming one of the drives (e.g. Drive 3) by turning on the ECU port the mouse emulator is plugged into. Turn “no driving” on.

When the student/user is ready for mouse emulation, place the student in front of the computer, and then by toggling the switch on the display, place them into the Drive chosen for mouse emulation (e.g. Drive 3), hit the reset/mode change switch, and the mouse emulator will be on and ready to go.

2. User control, combined within a single Drive (user area)

Add a reset/mode change switch which can be managed by the child herself. (this can be mechanical or electronic).

Then, using the remote programmer, choose a drive where mouse emulation will reside, e. g. Drive 1.

Choose Performance Adjustments, and scroll down menu to turn on Rim Control.

Also Turn on the specific ECU port for “communication” as discussed previously. SAVE these.

Now when the chair is turned on, the reset/mode/select switch will have to be touched first, WITHOUT touching any other switch.

The chair will first DRIVE forward. When the reset/mode/select switch is hit a second time, the chair will drive in reverse. When the reset/mode/select switch is hit a third time, ECU will be chosen, and the child can use mouse emulation.

3. User control, in separate Drive

A fifth switch (and/or Standby Time) is needed for this scenario. The child/user will now need to be able to handle choosing the Drives, and will then choose the drive the mouse emulation is working in. (This can be accomplished several different ways; adding a switch to just control the drives, or by changing the programming, turning on “Remote Select” in the Performance Adjustments Menu and turning it on. This then, allows the child/user to choose “drive select” and by hitting the left lateral switch of the head array, to move to the desired drive.)

4. Other Comments (By Karen and Lisa)

We did not go into all the details of how you can set up all possible and various scenarios, as we do not attempt to combine the mouse emulation and driving until the child/user is competent with both. Then, once the child/user is competent, the re-programming and configurations can be tried quite simply with the child, and she can choose her preference.

Our biggest concern, is that when adding mouse emulation, how to manage it becomes the focus of the configuration before the child gets an opportunity to use it. This is what we want to prevent. Please, please, set up the mouse emulation so that the child can experience and use it frequently and well. Once that occurs, then set it up for independent control.

PERMOBIL, QUICKIE, QUANTUM REHAB Powered chairs

For P & G electronics, (older chairs, Permobil, Quickie and Quantum Rehab/Pride)

1. You will need the Omni+ visual display
Programming occurs using the visual display.
2. You will push and hold down the Select button., then you will hold down the Mode button. (it must be in this sequence.; “Select, then Mode”)
3. A menu will appear, you will scroll down that menu until you reach Configuration 1.
4. You will then scroll through that menu until you find “ACM.” (*auxiliary control module*)
5. You will select ACM.
6. You will then exit the configuration menu.
7. You will then exit the first menu.
8. You will turn the system off.
9. When you turn the system on, the configuration for Mouse Emulation will be set.
10. To use this setting you will have to then find the menu with ACM in it..

For the head array user (3 switch plus reset/mode change switch).

1. The chair is always left ON (no on/off switch, will go to sleep when not being driven or used.)
2. User will hit reset/mode change switch two times successively (not too fast, not too slowly) to get to the first menu.
3. Then, the user will wait a moment (not too long, not too short), and hit the reset/mode change switch two more times, this will bring them to the second menu.
4. Then the user will use one of the head switches to scroll down the menu to ACM.
5. When ACM is selected, then the head array will work as a MOUSE.